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"School" Lateral Curvature

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BY HENRY O. FEISS, M. D., CLEVELAND

The spine is a flexible column divided into three curves: the highest or cervical is a convex curve forward, the next, the thoracic, is concave forward, and the lowest is like the lumbar, convex forward. These curves are to be regarded as the effect of balancing. They are attained by shifting the trunk into antero-posterior equilibrium and are maintained chiefly by muscular action.

In early infancy this muscular activity is not present and the child is not able to sit up, but as he grows, voluntary power comes into the muscles and the child learns to sit and finally to stand up. Later the whole action of balancing and maintaining the curves of the spine becomes an involuntary one.

By lateral curvature we understand a constant deviation of the spinal column or any part of it from the median line of the body. It is an asymmetry which is constant. There are various types classified according to their predisposing causes. We have the congenital type which is rare, the rachitic type due to rickets, the paralytic type arising from paralysis of muscles on one side or the other, the static type which is due to inequality of the legs, that type which follows diseases, and of the greatest importance—the type due to occupation.

It is the occupation type that comes under our present notice. We have seen that the normal curves of the spine are maintained as a result of balancing. The maintenance of these normal curves may serve as an analogy of the maintenance of abnormal

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curves. The spine being flexible it is capable of assuming many asymmetrical positions which are normal if they are not habitual. If, for example, on account of same particular occupation, any person maintains his spine steadily in an asymmetrical position, he will become used to that position and while doing his work will naturally assume this usual position as the easiest. This is not a so-called "habitual" asymmetry unless he takes that position naturally even when he is not at his occupation. However, if the curve is not naturally obliterated when his work is over, it may be that the person may resume the straight position by simply reminding himself to do it. Such a curve comes under the head of a flexible curve. If the curve cannot be straightened out without using undue force, we have a fixed curve. The longer a person has assumed an habitual curve, the more likely it is to be fixed. It is under the head of the occupation type that we must consider "school" scoliosis.

Dr Truslow,[1] of New York, found that in 400 cases of occupation scolioses, the following occupations were represented: School 285, factory 19, clerk 13, domestic 8, millinery and dressmaking 8, messenger 3, teacher 2, no occupation 59; making a total of 400.

Bradford and Lovett[2] made observations upon 67 healthy males who were taking an examination. At the end of two hours their attitudes were noted. In all cases there was a slight rotation of the spinal column. The authors assumed, therefore, that if a twist of the spinal column occurs in writing among strong men, faulty attitude must be extremely common in children.

In the last few years there has been considerable discussion as to whether a school scoliosis actually exists. The result of this discussion shows conclusively that the school does produce a great proportion of lateral curvature. The question has recently been investigated by Dr Scholder[3,4] of Lausanne, who says that school scoliosis is that more or less fixed and consolidated oblique position of the trunk which is attained by habit, and which is maintained by changes in the bones and ligaments. The faulty position of school children which, in its beginning, is physiological, gradually becomes pathological as the position becomes habitual. He further states that the

reason why certain physicians have not recognized school scoliosis is because they have only come in contact with such fully developed stages as would naturally appear in orthopedic institutes and hospitals, such as the rachitic and the paralytic types. These physicians, however, base their statistics on their own experience, not recognizing the fact that enormous numbers of children supposed to be well-formed, but who are not necessarily so, have not come under their notice. Therefore, he thinks the proper way to look into the question is to examine the children in school and to see how many are really scoliotic. He examined 2314 school children and found 571, or 24.67%, of these had lateral curvature. To be sure, the great majority of these did not show any marked degree but there certainly was this marked percentage of deformity.

As to the frequency of the scoliosis in the two sexes, he found them equally divided. This differs from the statistics in orthopedic institutions in which, figuring on nine different sets of statistics, the result was 85.8% scoliosis in girls and 14.2% in boys. The reason this is mentioned is to show that the statistics in orthopedic institutions differ from those based on school children. Krug in Dresden found results similar to Scholder in Lausanne.

In Scholder's 571 cases he found the great majority had a left curve and Krug's statistics show about the same. Scholder believes this tendency to a left sided lateral curvature is alone a sufficient argument that school is a determining factor in the formation of scoliosis, for such a lateral curvature corresponds to the faulty attitude usually assumed by children in sitting.

The author we have quoted gives another set of statistics for the separate classes, and found practically a steadily increasing percentage of scoliosis. This again is an argument that there is a "school" scoliosis for it shows that the children who have been longest in school have the greatest percentage of lateral curvature.

7th	class,	218	children,	19	cases	of	scoliosis—	8.7%,	myopia in 3. %
6th	"	257	"	47	"	"	18.2%	"	4.5%
5th	"	408	"	81	"	"	19.8%	"	5.2%
4th	"	404	"	110	"	"	27.2%	"	6. %
3rd	"	370	"	105	"	"	28.3%	"	8.5%
2nd	"	354	"	115	"	"	32.4%	"	19.4%
1st	"	304	"	94	"	"	31. %	"	19.4%

This table shows besides the percentage of increase in scoliosis, a similar increase in myopia.

Kilburn[5,6] of Boston has also reported on the causative relation between scoliosis and eye-strain.

Scholder shows how his statistics compare with those of other men in other towns.

Guillaume in Neuchatel, 731 school children, 218 cases of scoliosis—29%
Krug in Dresden, 1418 school children, 357 cases of scoliosis—25%
Hagmann in Moscow, 1664 girls 29%
Kallbach in Petersburg, 2333 girls 26%
Scholder-Weith-Combe, Lausanne, 2314 children, 571 cases of scoliosis 23.67%

The conclusion that Scholder drew was that one-fourth of the school children were scoliotic and he designates as the type of school scoliosis an "habitual" form with a left curve.

In considering the treatment of school scoliosis we must recognize the cause, for it is by the prevention that we get the best results. We find two chief causes: First, prolonged attitude, and, second, faulty attitude. The latter may be due, first, to faulty furniture; second, to faulty inclination of the copy-book, and, third, to faulty obliquity of writing. There are other causes of which we may mention faulty lighting. In prolonged attitude the danger is that the tired child wishes to shift its position whether it is a good one or a bad one. The muscles relax and the whole spine collapses into any one of the vast number of faulty positions. It gradually becomes used to one position which we may call the habitual one. The child only gets out of this habitual faulty position when reminded to do so. The point is that we must avoid tiring the child by prolonged attitude. We may do this perhaps by letting the child take a few muscular exercises at various intervals or by any other means which are practical.

As to faulty attitude due to faulty furniture this may be due either to incorrect designing of the individual furniture or to a disproportion between desk and chair. The question of school furniture[7] is a difficult problem because it is so hard to say exactly what furniture is the most suitable. In this matter we ought to be guided more by common sense than anything else. The desk should be large enough, of the right height, according to the size of the student, and not too much inclined. The chair should be comfortable. The distance between the desk and the chair is of relatively great importance. It should not be too great, or the head must be bent too far forward which would tend to round shoulders. Scholder thinks that the back

rim of the desk should be perpendicular with the front border of the chair seat.

The question of the position of the copy-book is of some importance for if the copy-book is very oblique, the head must be turned, which means a curve in the spine. This would imply, moreover, that one eye would be nearer to the book than the other.

It is doubtful whether this position of the copy-book is of great importance but to be on the safe side it would seem, according to concensus of opinion, that the copy-book should be vertical. Then the question comes up as to the obliquity of the writing. Should the oblique style be advocated? Of course if the copy-book is to be vertical the writing must be vertical. Logically this would seem to be the only correct position. The quality of the hand writing from that position ought not to enter into the question, since it is the favorable position for keeping the child straight and for keeping the eyes at equal distance from the book.

On the question of school scoliosis Hoffa[8] writes as follows: "The most important part of the treatment of lateral curvature consists in the prophylaxis." He advocates limitation of the number of school hours, simplification of the teaching program, reduction in the amount of home work, regular methodical gymnastic work with a view of the increased mobility of the spinal column and the strengthening of the muscles, especially those of the spine. Further when we recognize that scoliosis is acquired through incorrect posture disease, then the hygiene of school seating becomes an especial point in the prophylaxis.

Schultess[9] of Zurich takes the following point of view: He says that when we refer to a school scoliosis we mean a left convex total scoliosis and lumbar scoliosis of girls. In the other forms of scoliosis the school is not to be recognized as the chief cause. His theory is that the spine of the child, which is naturally prone to bend to the left, is given the opportunity to assume the attitude and to maintain it for some time on account of writing. For children which are prone to the other types of curves, it is the prolonged sitting position which does the harm. The student sits as he has grown and faulty curves are maintained. As to remedy he advocates measures similar to Hoffa's, (vertical writing).

Lorenz[10,11] writing in 1889, says that he believes the extreme work of prolonged sitting is a more important point in the prevention than faulty furniture.

The conclusion that we may draw from all the foregoing is

that there is such a thing as a school lateral curvature. Whether it is a left lateral curve or a curve of another variety is of relatively little importance, the point being that the school is a predisposing cause to deformity.

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